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EXAMINER	
RIZK, SAMIR WADIE	
ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/600,419	SONG ET AL.	
	Examiner	Art Unit	
	SAM RIZK	2112	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *2/7/2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6,8-16,18-26,29-41,43-48,51-58,60-68 and 71-78* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6, 8-16, 18-26, 29-41,43-48, 51-58, 60-68 and 71-78* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 June 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

- Response to the applicant's amendment dated 2/7/2008
- Claims 7, 17, 27, 28, 42, 49, 50, 59, 69 and 70 have been cancelled
- Claims 1-6, 8-16, 18-26, 29-41,43-48, 51-58, 60-68 and 71-78 have been submitted for examination
- Claims 1-6, 8-16, 18-26, 29-41,43-48, 51-58, 60-68 and 71-78 have been rejected

Response to Arguments

1. Applicant's arguments see pages 24-32, filed on 2/7/2008 have been fully considered but they are not persuasive.

2. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies, for example:

a) Averaging can be based on the quality measure, such as by excluding a read signal with a low quality measure from the averaging. and

b) The signals that are averaged can vary... [...] obtained signals can **be** excluded from the averaging based on a signal quality metric. are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

3. Even if above feature would be cited in the claims. Rothberg (US patent no. 7136244) teach this feature. The applicant is referred again to FIG. 4 wherein Rothberg teaches the signals that are averaged (reference character 34) from obtained signals (reference characters (32_0) through (32_4) can **be** excluded from the averaging based on a signal quality metric. Simply and obviously, if signal quality metric has a value of "0.0" that signal would be excluded from averaging.

4. Further more, Rothberg in col. 4, lines (1-27) teaches the method of averaging operation which excludes weak signals. For example Rothberg teaches (emphasis added):

> The averaging operation is illustrated in FIG. 2 as a number of estimated data sequences 32.sub.0 32.sub.N averaged together to generate the estimated data sequence 34 comprising the averaged data bits. However, any suitable method may be employed to generate the averaged binary bits in the estimated data sequence 34. In one embodiment, the buffer 10 stores a count value for each occurrence of a "1" bit for each binary symbol. The count value for each "1" bit is then divided by the number of retries attempted. If the result of the division is greater or equal to 1/2, then the averaged binary bit in the estimated data sequence 34 is assigned a "1" bit, otherwise it is assigned a "0" bit. This is illustrated in FIG. 3 which shows an estimated data sequences 32.sub.0 detected during an initial read operation, and four estimated data sequences 32.sub.1 32.sub.4 detected during four retry operations. The binary bits in the estimated data sequences 32.sub.0 32.sub.4 are averaged together to generate the estimated data sequence 34 comprising averaged binary bits 36.sub.0 36.sub.N. The first averaged binary bit 36.sub.0 is assigned a "1" bit since there are three "1" bits in the corresponding bit of the estimated data sequences 32.sub.0 32.sub.4, and 3/5 is greater than or equal to 1/2. The second averaged binary bit 36.sub.1 is assigned a "0" bit since there is one "1" bit in the corresponding bit of the estimated data sequences 32.sub.0 32.sub.4, and 1/5 is not greater than or equal to 1/2. The remainder of the averaged binary bits 36.sub.2 36.sub.N are assigned a "1" or "0" in a similar manner.

4. The Examiner disagrees with the applicant and maintains the rejection of claims (1-6, 8-16, 18-26, 29-41, 43-48, 51-58, 60-68 and 71-78) as in the office action mailed on 11/8/2007. All the amendments and arguments have been considered. It is the Examiner's conclusion that claims (1-6, 8-16, 18-26, 29-41,43-48, 51-58, 60-68 and 71-78) is not patentably distinct or non-obvious over the prior art of record in view of the reference(s), Rothberg US patent no. 7136244 and Takashi et al. US patent no. 6519715. Therefore the rejection is maintained.

5. In regard to the Applicant arguments in page 31, lines 9-17, The Examiner agrees that the scope of claims 9, 19, 30, 43, 52, 61 and 72 is different from the scope of claim 1. However, Rothberg also teaches the same limitations as cited in the rejection below. This action will be considered final.

5. Updated rejections of claims 1-6, 8-16, 18-26~ 29-41, 43-48, 51-58, 60-68 and 71-78 of the office action mailed on 11/8/2007 follows.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1,2, 9-12, 19-24, 26, 30-35, 43-46, 52-54, 68 and 72-78 are rejected under 35 U.S.C. 102(e) as being anticipated by Rothberg US patent no. 7,136,244 (Hereinafter Rothberg).

7. In regard to claim 1, Rothberg teaches:

- A signal processing apparatus comprising:

- an input to receive a signal;

(Note: FIG. 1B reference character (14) in Rothberg)

- a buffer responsive to the input to store the signal;

(Note: FIG. 1B reference character (16) in Rothberg)

- a detector responsive to the input to interpret the signal as discrete values;

(Note: FIG. 2, reference character (24) in Rothberg)

- an averaging circuit responsive to the buffer and the detector to cause interpretation, by the detector during a retry mode, of a new signal comprising an average of a previous signal stored in the buffer and a current signal; and

(Note: FIG. 1B reference character (20) in Rothberg)

- a control circuit that determines whether the discrete values are adequately indicated based on output of the detector, that initiates the retry mode when the discrete values are not adequately indicated, and that determines whether the discrete values are adequately indicated from the interpretation of the new signal in the retry mode, and

(Note: FIG. 1 B, reference character (18) and FIG. 8, reference characters

(68) and (72) and col. 8, lines (55-65)in Rothberg)

- an error correction circuit responsive to the detector and the averaging circuit to provide a signal quality metric that governs which signals are averaged.

(Note: FIG. 4 and col. 4, lines (27-58) in Rothberg)

8. In regard to claim 2, Rothberg teaches:

The apparatus of claim 1, wherein the signal from the input comprises a read signal received from a storage medium.

(Note: FIG. 1 B, reference character (10) in Rothberg)

9. In regard to claim 9, Rothberg teaches:

- signal processing apparatus, comprising:
- an input to receive a signal;

(Note: FIG. 1B reference character (14) in Rothberg)

- a buffer responsive to the input to store the signal;

  a detector responsive to the input to interpret the signal as discrete values;

(Note: FIG. 1B reference character (16) in Rothberg)

- an averaging circuit responsive to the buffer and the detector to cause interpretation, by the detector during a retry mode, of a new signal comprising an average of a previous signal stored in the buffer and a current signal; and

(Note: FIG. 1B reference character (20) in Rothberg)

- a control circuit that determines whether the discrete values are adequately indicated based on output of the detector, that initiates the retry mode when the discrete values are not adequately indicated, and that determines whether the discrete values are adequately indicated from the interpretation of the new signal in the retry mode;
- (Note: FIG. 1 B, reference character (18) and FIG. 8, reference characters (68) and (72) and col. 8, lines (55-65)in Rothberg)
- Wherein the control circuit determines whether the discrete values are adequately indicated based on comparison of interpretations of the new averaged signal and the current signal.

(Note: FIG. 4 and col. 4, lines (1-27) in Rothberg)

11. Claims 12, 22, 34, 45, 53, 64 and 72 are rejected for the same reasons as per claim 1.

12. Claims 19, 30, 43, 52, 61, 64 and 72 are rejected for the same reasons as per claim 9.

13. In regard to claim 10, Rothberg teaches:

- The apparatus of claim 1, a wherein the control circuit causes averaging of a defined number of most recent input signals, wherein the defined number is greater than two.

(Note: FIG. 2, reference characters (320 - 32n) in Rothberg)

14. In regard to claim 11, Rothberg teaches:

The apparatus of claim 1, wherein the control circuit causes the previous signal stored in the buffer to be an averaged input signal when two or more signals are obtained in the retry mode.

(Note: FIG. 2, reference characters (320 - 32n) in Rothberg)

15. Claims 20, 31, 62, 73, 76, 75 and 78 are rejected for the same reasons as per claim 10.

16. Claims 21, 24, 32, 33, 44, 63, 66, 74 and 77 are rejected for the same reasons as per claim 11.

17. In regard to claim 22, Rothberg teaches;

A method of reading data on a channel or media, the method comprising;

- interpreting an input signal as discrete values; and

- deciding whether the discrete values have been adequately interpreted from the input entering a retry mode in response to a decision that the discrete values have not been adequately interpreted from the input signal; and an inadequate signal;

- averaging, in the retry mode, multiple signals to improve interpretation of the input signal including:

- obtaining a second signal representing same data as the input signal,

- averaging the input signal and the second signal to produce an averaged signal and to improve signal interpretation;

- interpreting the. averaged signal, and

- determining whether the discrete values are adequately indicated

based on the averaged signal

(Note: Claim11 in Rothberg)

18. Claims 23, 35, 46, 54 and 65 are rejected for the same reasons as per claim 2.

19. In regard to claim 26, Rothberg teaches:

- The method of claim 22, wherein the input signal comprises a read signal received from a storage medium, interpreting the input signal comprises determining if the read signal adequately indicates the discrete values, and averaging the multiple signals comprises averaging multiple read signals of the storage medium to improve read signal interpretation.

(Note: FIG. 3 and col. 4, lines (13-26)in Rothberg)

20. Claims 34 and 45, 64 are rejected for the same reasons as per claim 22.

21. Claims 43, 52, 61,68 and 72 are rejected for the same reasons as per claim 26.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for

determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

22. Claims 3-6, 8, 13-16, 18, 25, 29, 36-41,47, 48, 51,55-58, 60, 67 and 71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rothberg as applied to claim 1 above, and further in view of Takashi et al. US patent no. 6519715 (Hereinafter Takashi)

23. In regard to claim 3, Rothberg teaches substantially all the limitations in claim 1.

However, Rothberg does not teach

- The apparatus of claim 1, wherein the signal from the input comprises an analog signal, the apparatus further comprising a filter and an analog-to-digital Converter (ADC) coupled between the input and the detector.

Takashi, in an analogous art that teaches improved reliability of the data recovery processing and data recording from storage medium teaches:

- The apparatus of claim 1, wherein the signal from the input comprises an analog signal, the apparatus further comprising a filter and an analog-to-digital converter (ADC) coupled between the input and the detector. (Note; Figure 1, reference characters (1), (3) and (4)in Takashi)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Takashi that comprises a filter and an analog-to-digital converter (ADC) coupled between the input and the detector with the teaching of Rothberg. This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized the need for improved reliability of the data recovery processing and data recording from storage medium teaches.

24. In regard to claim 4, Takashi teaches:

- The apparatus of claim 3, wherein the buffer is coupled between the ADC and the filter.

(Note: FIG. 2, reference character (6) in Takashi)

25. In regard to claim 6, Takashi teaches:

- The apparatus of claim 3, wherein the filter comprises a finite impulse response (FIR) digital filter coupled between the ADC and the detector.

(Note: col. 8, line 42 in Takashi)

26. In regard to claim 8, Takashi teaches:

- The apparatus of claim 1, wherein the detector comprises a Viterbi detector.

(Note: FIG. 35, reference character (13) in Takashi)

27. Claim 13, 38, 47 and 55 are rejected for the same reasons as per claim 3.

28. Claims 14, 36, 39 and 56 are rejected for the same reasons as per claim 4.

29. Claims 15, 40 and 57 are rejected for the same reasons as per claim 5.

30. Claims 16, 25, 48, 58 and 67 are rejected for the same reasons as per claim 6.

31. Claims 18, 27, 29, 41,49, 51,60, 69 and 71 are rejected for the same reasons as per claim 8.

32. Claim 37 is rejected for the same reasons as per claim 11.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sam Rizk whose telephone number is (571) 272-8191. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jacques Louis-Jacques can be reached on (571) 272-6962. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronics Business Center (EBC) at 866-217-9197 (toll-free)

/Sam Rizk/

Examiner, Art Unit 2112

/JACQUES H LOUIS-JACQUES/

Supervisory Patent Examiner, Art Unit 2112